

EVALUATION OF SOUTHERN PINE BEETLE INFESTATIONS ON THE
NOLICHUCKY, OCOEE, AND TELlico DISTRICTS OF THE
CHEROKEE NATIONAL FOREST, TENNESSEE

By

Larry R. Barber and Robert F. Bassett

INTRODUCTION

A southern pine beetle activity evaluation was conducted on three districts of the Cherokee National Forest during the late summer of 1975. Included in the evaluation were the Tellico, Ocoee, and Nolichucky Ranger Districts. Both aerial sketchmap and ground survey techniques were used.

METHODS

Standard aerial sketchmap and ground techniques were used during the current evaluation.^{1,2/} A 50 percent aerial sketchmap survey was conducted on the Ocoee and Tellico Ranger Districts while a 25 percent aerial survey was conducted on the Nolichucky Ranger District. Representative spots were ground checked to confirm the cause of mortality, to determine the number of trees infested with southern pine beetle, and to observe the general condition of the beetles.

TECHNICAL INFORMATION

Insect - Southern pine beetle, *Dendroctonus frontalis* Zimm.

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- 1/ Detection of Forest Pests in the Southeast, 1970. USDA, USFS, SA, S&PF, Div. FPM, Pub. S&PF-7, Atlanta, Ga. 51 pp.
2/ Evaluating Southern Pine Beetle Infestations, 1970. USDA, USFS, SA, S&PF, Div. FPM, Pub. FPM-8, Atlanta, Ga. 35 pp.

Hosts - Southern pine beetle is a native forest pest that will attack all species of southern yellow pine. However, loblolly pine, *Pinus taeda* L., and shortleaf pine, *P. echinata* Mill., are the preferred hosts.

Type of damage - Death of the tree is the result of mining in the cambium by the southern pine beetle as it constructs egg galleries. The beetle also introduces blue stain fungi, *Ceratocystis* spp., which slow down or block conduction of water in the stem.

Life cycle of the beetle - The beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark where they pupate or change to adults. The new adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer and as many as four or five generations may be produced annually in this area.

RESULTS AND DISCUSSION

Results of the current evaluations revealed a decreasing southern pine beetle population on two out of three Ranger Districts of the Cherokee National Forest. The present level of beetle activity continues to be high on the Nolichucky Ranger District (Table 1).

Tellico Ranger District

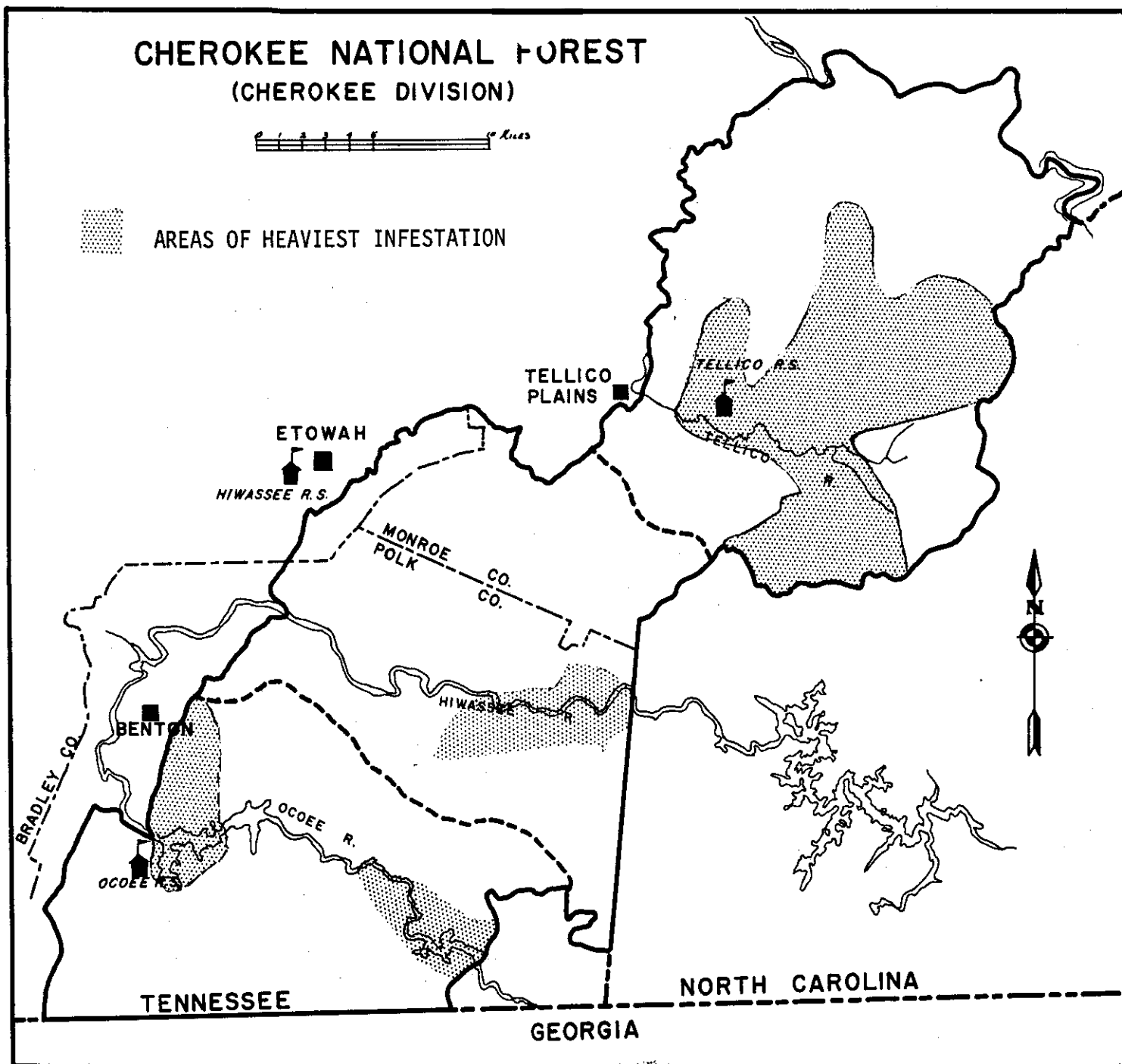
The 1975 evaluation revealed that the number of spots and the number of infested trees dropped sharply from the 1974 survey. There were 364 infested trees on the district this year compared to 1,308 last year (Table 1). The sharp drop in beetle attacks this year was not expected as in 1974 the population appeared to be increasing. Figure 1 shows the areas of heaviest beetle infestation.

Damage next year can be expected to be low to moderate.

Ocoee Ranger District

The beetle population and damage dropped on this district from last year's figures. This year there were 155 infested trees causing a loss of 1,008 cu. ft. of timber, compared to a loss in 1974 of 13,624 cu. ft. (Table 1). The potential for loss in 1976 with existing beetle population trends is low.

Figure 1. Location of heaviest southern pine beetle infestation on Ocoee and Tellico Ranger Districts during 1975 aerial sketchmap survey.



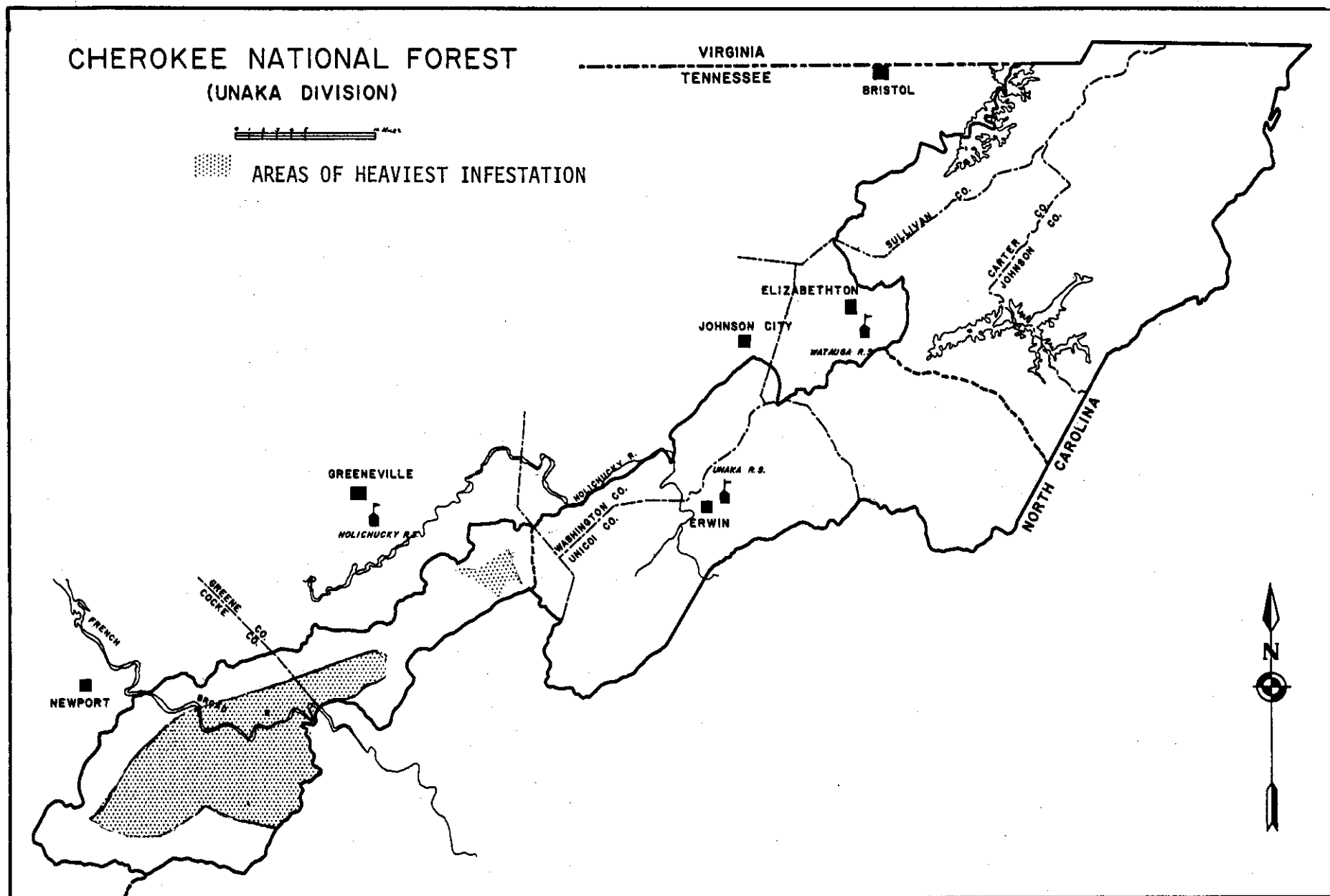


Figure 2. Location of heaviest southern pine beetle infestation on the Nolichucky Ranger District during 1975 aerial sketchmap survey.

Table 1. Summary of results of southern pine beetle evaluations conducted on the Ocoee, Tellico, and Nolichucky Districts of the Cherokee National Forest, Tennessee - 1975.

	Ownership Unit		
	Ocoee	Tellico	Nolichucky
1. Results compiled from data collected during the aerial phase of the evaluation:			
Survey type	Sketchmap	Sketchmap	Sketchmap
Date of aerial survey	8/14/75	8/14/75	8/4/75
Total acreage surveyed	150,163	188,000	168,947
Total susceptible host type	81,088	65,813	39,000
Total number of spots within the survey boundary	32	81	401
Spots per M acre of host type (trees)4	1.2	10
Average spot size (trees)	5	6	82
Range of spot sizes (trees)	1-10	1-35	1-1000
2. Results compiled from data collected during the ground and aerial phases of the evaluation:			
Date of ground phase	8/17/75	8/18/75	8/12/75
Infested trees per M acre of host type	1.9	5.5	446
Total number of infested trees within the survey boundary	155	364	17,377
Ratio of green infested to total red and fading trees	1:2	1:13	1:3.4
Total volume of infested trees (cu. ft.)	1,008	5,933	145,967

Nolichucky Ranger District

The southern pine beetle population has decreased some from last year, but continues at a high level. There were 17,377 trees infested this year compared to 24,624 last year (Table 1). Unless natural factors intervene, the outbreak is expected to continue at a high level in 1976. Figures 1 and 2 show the areas of heaviest infestation.

Because of the decline in southern pine beetle population levels on the Ocoee and Tellico Ranger Districts, the most intensive suppression efforts should be directed to the more severely infested Nolichucky Ranger District. (Figures 1 and 2). However, the opportunity to reduce the beetle population to an endemic level exists on the Ocoee and Tellico Ranger Districts, and intensive surveillance and control should be continued for spots with continuing beetle activity and for new spots.

RECOMMENDATIONS

Where timber resources can justify suppression measures, the districts should continue to follow guidelines outlined in the 5250 section of the Forest Service Manual which are as follows:

1. Removal of Infested Trees by Commercial Sale or Administrative Use. When infested trees of merchantable size are accessible, they should be removed by commercial sale or administrative use procedures. Logging of the infested material should begin immediately. Contract time limits should insure rapid removal.

Where practical, and if host type is present, a 40- to 70-foot buffer strip should be marked and cut adjacent to and ahead of the most recently infested trees. This practice is effective in reducing the possibility of "breakouts." When only a small volume of infested merchantable material occurs in a spot, noninfested trees surrounding the spot may be marked to provide an operable cut.

The order of priority for removing beetle infested timber from a spot should be as follows:

Trees having nearly developed broods (usually the red and fading trees).

Trees having young broods (usually the green, recently infested trees).

Trees in the buffer zone.

2. Piling and Burning. Unmerchantable or inaccessible southern pine beetle infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be

thoroughly burned to insure effective control. The order of priority for cutting, piling, and burning infested trees, particularly the large spots, is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the piling and burning operation.

3. Chemical Control. Chemical formulation recommended for southern pine beetle control is a 1/2 percent lindane spray with No. 2 fuel oil as the carrier. This may be formulated from a 20 percent lindane emulsifiable concentrate or oil concentrate at the rate of 11 pints of concentrate in enough fuel oil to make 55 gallons of spray. (Ratio of one part 20 percent lindane EC to 39 parts No. 2 diesel fuel).

Cut, limb, and buck all infested trees into workable lengths. Spray the infested bark surface to the point of run-off. A compressed air sprayer (3-gallon capacity or equivalent) is an ideal applicator. Infested logs must be turned two or three times to insure complete treatment of infested bark. Spray stumps and bark removed by woodpeckers. Low pressure sprayers may be used to treat large, accessible infestations.

The order of priority for cutting and spraying infested trees in large spots is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the chemical control operation.

Never spray trees from which southern pine beetle brood has emerged. Natural enemies of the southern pine beetle in these trees can then complete their development. To prevent aerial spotters from mapping treated spots, cut trees with red needles from which beetles have emerged.

Instructions for minimizing the adverse effects of mixing, transporting and storing pesticides, applying pesticides and disposing of pesticide containers and excess chemicals are outlined in section 8.3 of the Forest Service Health and Safety Code and FSM 5242.21. Detailed safety procedures should be outlined in the project suppression plan.

4. Reexamination of Treated Areas. Reexamine areas where infested trees were removed by commercial sales, piled and burned, or chemically treated within two or three weeks after treatment to check for additional infested trees. If additional trees are found, treat them.

PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.